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University of Nevada, Reno

**Analysis of Factors that Influence Perspective-taking in Young Children**

A thesis submitted in partial fulfillment  
of the requirements for the degree of

**BACHELOR OF ARTS, PSYCHOLOGY AND POLITICAL SCIENCE  
AND HONORS PROGRAM**

by

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Linda J. Hayes Ph.D., Thesis Advisor

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We recommend that the thesis  
prepared under our supervision by

**EMILY LOUISE SKORZANKA**

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## Abstract

The variables that affect a young child's ability to perspective-take have seldom been researched in the area of behavior analysis. This study investigated the role of verbal behavior, duration of relationship, and to a lesser extent, the demographic factors that may affect a child's ability to acquire the skill of perspective-taking. Sessions were conducted with five preschool participants ranging from 3 to 5 years of age. Each participant partook in video observation sessions, but the number of sessions was based on the child's acquisition rate of this skill, and therefore ranged from 3 to 16 sessions. Further, data were taken on verbal behavior, such as statements of preference and observational statements, and reinforcement was provided for correct accounts. Results showed that while duration of relationship and verbal behavior did not influence the participants' ability to perspective-take, they shed light on other demographic variables that appeared to contribute to each participants' acquisition rate. The results of this study may help to further research in this area and develop affective ways to teach the skill of perspective-taking to children.

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## **Introduction**

Perspective-taking has been defined as the capacity to infer another's thoughts, feelings, or internal states of knowledge (Borke, 1971; Chandler & Greenspan, 1972). This is a particularly complex phenomenon as the perceiver must take into consideration his or her own past behavior and how another's behavior may be the same or different in various circumstances. The ultimate demonstration of the most complex form of perspective-taking is when the perceiver accurately predicts another's behavior in novel situations.

While perspective-taking occurs throughout one's lifetime (facilitating appropriate behavior with respect to others in many situations) it has been shown that this behavior is initially acquired at a very young age (Borke, 1971). Deficits in perspective-taking are also seen throughout adulthood when people have difficulties maintaining or acquiring romantic, work place, and various other types of social relationships. A few examples of perspective-taking that can be extrapolated upon are: understanding how a spouse feels so fights and misunderstandings can be avoided or negotiated, or predicting what a professor requires on an assignment based off previous constructive feedback that he/she has given. It is obvious that, if one could not perspective-take in these circumstances, one may have trouble functioning in these situations in a socially appropriate manner.

An understanding of the acquisition of this skill in young children will contribute to the perspective-taking literature by demonstrating to what degree the ability to acquire this complex skill is related to the duration of the relationship with another individual and the occurrence of verbal behavior. Moreover, a better understanding of this phenomenon



could lead to training techniques suited to persons showing perspective-taking deficits or individuals who had previously been unable to learn this skill. This study will also contribute to the field of Behavior Analysis and psychology as a whole because there has been little to no research done on the acquisition of this skill in typically developing children while there have been immense amounts of research done with children diagnosed with intellectual disabilities or social disorders. More research has been done with children with intellectual disabilities because a lack of the perspective-taking skill is a hallmark trait that those children have trouble learning independently (Rehfeldt, Dillen, Ziomek & Kowalchuk, 2007).

Given the importance of perspective-taking, it is not surprising that this repertoire has been studied extensively. Unfortunately, in many of these investigations, the variables that are involved in the development of this essential ability have not been adequately isolated or examined. If these variables could be identified, effective procedures could be developed to establish this repertoire in very young children, enhancing their social development with life-long benefits. This study isolated and examined verbal behavior, duration of relationship, and on a smaller scale, demographic factors as variables that may influence the ability for a child to develop the skill of perspective-taking.

### **Literature Review**

Perspective-taking is a relatively new phenomenon that has been examined through scientific research for the past 60 to 70 years. Perspective-taking is the ability to accurately report another's preference, feelings, or knowledge on a particular matter. (Borke, 1971; Chandler & Greenspan, 1972) Perspective-taking is also the base skill for

having the capacity to be empathetic or sympathetic because without the ability to perspective-take, one would not be able to understand another's feelings as they may be different from one's own. Perspective-taking is a critical skill for a young child to learn, as it is essential for the development of appropriate communication skills and positive social interactions (Brown & McNeill, 1966; Krauss & Glucksberg, 1969). When a child fails to take another's point of view, it is often the case that the child has difficulty establishing and maintaining friendships (Selman, 1981). These difficulties often persist into adulthood (Keysar, Lin, & Barr, 2003). Further, many types of social/personality inadequacies appear to arise from perspective-taking difficulties, fostering interpersonal misunderstandings and intolerance (Griffin, Dunning, & Ross, 1990).

The field of Behavior Analysis has a unique method of analyzing psychological events such as perspective-taking. A psychological event, as defined by the founder of Behavior Analysis, B.F. Skinner, is any event that can be observed and measured. (Skinner, 1945) Therefore, when analyzing an event such as perspective-taking, the use of terms such as cognition or inference, which are more popular in other branches of psychology, as reasoning or explanation for a person's behavior will not be used. Cognitions and inferences made by a person cannot be observed or measured and will not be used for analysis in this study. Further, although a neuroscience approach can be said to be able to measure the perspective-taking phenomenon, the aim of this study is to test this in the most natural social environment as possible, which may not be possible with a neuroscience approach.

Research within this field began with studies such as Borke's (1971), which shows that children between the ages of 3 and 8 have immense difficulty in being able to

report how a character in a story feels. Borke (1971) shows that in relation to this difficulty, children can not separate their own emotions from the ones they report the character having; therefore, the participants lack the ability to infer another's state of mind. Further, Chandler and Greenspan (1972), in a reply to Borke's (1971) work, bring to light that not only is this skill deficit seen in young children, but also, perspective-taking is a skill that children may have issues developing later in adolescence, between the ages of 6 and 12. Mossler, Marvin, and Greenberg (1976) later summarize the issue of identifying the age of acquisition of this skill and go on to show through their research that children between the ages of 4 and 5 can perspective-take because they can infer accurately, but the same children can not justify the inferences accurately. The findings from Mossler, Marvin, and Greenberg (1976) show that variables such as history of education and interaction opportunities must be further explored to help determine when the perspective-taking skill is developed.

There are two key theories in the field of Behavior Analysis that deal with analyzing one's ability to perspective-take. The two most common methods are Theory of Mind (which is responsible for the Sally Anne task) and Relational Frame Theory. Theory of mind is discussed by Premack and Woodruff (1978) as one's ability to impute a mental state to others and to oneself. Research in theory of mind is most commonly conducted with children diagnosed with Autism Spectrum Disorders (ASD) because this population tends to have deficits in this area. This common type of research with children with ASD is exemplified by LeBlanc, Coates, Daneshvar, Charlop-Christy, Morris, and Lancaster's (2003) study wherein they perform a version of the common perspective-taking task called the Sally Anne task wherein children with autism were seen performing

less accurately than typically developed children. More generally, the Sally Anne task involves showing a video, puppet, or picture board version of a story about two dolls. For example, in one version of the task, a doll puts a marble in a basket and leaves. While the first doll is gone, a second doll comes and moves the marble to a different location and leaves. The question is then posed to the child about where the first doll will look for the marble when she returns. If the participant responds by stating that the first doll will look in the basket, then it is stated that the participant has a theory of mind. If the participant states that the first doll will look for the marble in the second location (where the second doll put it), it would be said that the participant has not formed a theory of mind, since he/she did not discriminate his or her own knowledge (as a viewer) from the knowledge of the first doll. Theory of mind studies, with various methodologies, have been instrumental in analyzing factors that influence the ability to perspective-take in both developmentally disabled and typically developed children (Happé, 1995). For example, Happé (1995) shows that kids diagnosed with autism need a higher verbal mental capacity to pass theory of mind false-belief tasks than typically developed kids.

The second type of perspective-taking approach to empirical research is relational frame theory. Relational frame theory views perspective-taking as a form of learned responding involving ‘deictic’ relations of three frames, here-there, now-then, and I-you. (Rehfeldt, Dillen, Ziomek & Kowalchuk, 2007); to add more complexity to the perspective-taking task, these frames can be further reversed and double-reversed. An example of a simple relation and experimenter may give: “I have a red brick and you have a green brick. Which brick to I have? Which brick do you have?” (A child who is said to show perspective-taking of another would correctly answer, “red, green” in

response to this question). As a child shows more development within this skill, the ability to answer such questions increases in complexity and soon moves to dealing with more than one form of frame in a single question. For example, a double reversed relation is, “Yesterday I was sitting there on the blue chair, today I am sitting here on the black chair. If here was there and there was here and if now was then and then was now, where would I be sitting then?” The answer of one who can perspective-take would answer, “blue, black” in response.

While these methods are commonly used and have many lines of research to prove their efficacy in determining one’s perspective-taking skill level, these methods do not analyze many of the variables that may affect a typically developed child’s ability to acquire this skill and to demonstrate this skill (Happé, 1995). Furthermore, other studies have not thoroughly explored other variables such as education level, length of treatment, and demographic factors that may be involved in the acquisition of this skill (Rehfeldt, Dillen, Ziomek & Kowalchuk, 2007). However, Müller, Liebermann-Finestone, Carpendale, Hammond & Bibok (2012) investigated the relationship of some of these factors in relation to perspective-taking with typically developed children. Müller and colleagues examined the relation between executive function and theory of mind, which is more simply, the relation between development of mental capacity (for example, working memory) and the ability to engage in perspective-taking. Not only did this study show that a higher level of executive function was correlated with a theory of mind, but also verbal behavior was found to be a factor as well (Müller et al., 2012).

Müller’s research highlights a variable that may be significant in determining whether a child can engage in the skill of perspective-taking. Language, the ability to

label and describe what a person is observing in their environment may greatly influence a child's ability to engage in perspective-taking tasks. For example, Astington and Jenkins (1999) study reveals that the ability to perform accurately on false belief tasks is directly correlated to performance on language tests. In another of Astington and Jenkins' studies, they show that a greater lingual repertoire predicts better performance on perspective-taking tasks, but perspective-taking performance is not predictive of greater lingual repertoire. (Astington & Jenkins, 1999) In a study conducted by Hughes and Dunn (1997), children were filmed playing together and data is taken on mental-state talk (e.g. "The girl looks sad that the toy broke."). Further, the participants in this study were also given a variety of theory of mind tasks. Hughes and Dunn show that the children who engage in more mental-state talk also show higher performance on theory of mind tasks. Given these findings, further exploration of the degree to which verbal behavior is involved in perspective-taking is warranted, particularly in the acquisition period of this repertoire.

Preliminary perspective-taking research conducted at the University of Nevada, Reno lead to investigating the specific variables in the proposed study. In these studies, variables such as age and gender show no relationship with a child's ability to perspective-take in these studies. Results from the first study indicates that verbal behavior is a variable that is likely to contribute to this phenomenon, and when it was tested in the second study, results show that verbal behavior along with other factors may affect a child's ability to perspective-take (Skorzanka, Watkins, DeBernardis, & Hayes, 2011).

Collecting demographic data helps to make correlational observations across

many small variables such as education level and familial relations, so further research into the possibility of these relationships is necessary. Further, verbal behavior and duration of relationship are included via data from previous work. A measure of verbal behavior was included in the second of the two studies because transcriptions of conversation from participants of the first study indicate that child who were able to perspective-take engaged in more statements reporting on the other child's actions or preferences (Skorzanka, Baker, Willmoth, DeBernardis, & Hayes, 2012). There were a variety of factors that lead to the second study not accumulating enough data to make correlational observations about verbal behavior such as participant drop out, and session interruptions (DeBernardis, 2011). Verbal behavior will therefore be examined in this study. The duration of relationship between two people is also hypothesized to affect one's ability to accurately predict the internal states of knowledge and beliefs of another. DeBernardis (2009) showed that duration of relationship played a role to a lesser degree than quality of the relationship; however, due to the nature of this investigation, it makes sense to examine the more basic factor involved which is duration (i.e., number for exposures) to further explore the relationship between duration of relationship and perspective-taking.

### **Methodology**

Participants were five children between the ages of 3 and 5 years old who were attending preschool. Participants Todd, Ella, and Lily were three years of age. Max was four years of age, and Jacob was five. The preschools that the participants attended were The University of Nevada, Reno Family and Research Centers on the university campus. Experimental sessions were run between 8:00am and 10:30am in the morning everyday

to ensure as to not impede on school time. The parental survey was given to parents to fill out their information within the consent packet (Appendix).

All participants were tested individually in a private section of the school and a video camera will be located in the corner of the room so that the activities of each session will be captured. The location of the camera ensured a distraction free environment and to ensure no other children were video taped. The experimenter set aside additional rapport building time with the participants by participating in school activities that was not related to working with toys.

The materials used for this study were an iPad 3<sup>rd</sup> generation to show videos to participants and to take photographs, a tripod video camera, and various toys (described later). Only one session was run per day, per participant. The independent variables in this study were duration of relationship, verbal behavior, and demographic factors and dependent variable was ability to perspective-take.

The preferences of the confederate children were purposely set up to be different from the stereotypical preferences of a young boy or girl. The participants were shown that the male confederate child preferred feminine toys instead of masculine and neutral toys, and the female confederate child preferred masculine toys instead of feminine and neutral toys. The participants, in order to be accurate, had to show the confederate child's shift in preference from the social norm (boys enjoy masculine toys and girls enjoy feminine toys) to the gender opposite preference. The pre-test was performed to ensure the participant assumed the same sex confederate child preferred the gender-matched toys (if they did not report these preferences, a shift in preference would not be apparent). Further, if the skill of perspective-taking was present, a shift of the preference of the



confederate child was reported in the post-test by the participant where he/she reported the confederate preferred gender-opposite toys.

### **Session 1**

Each participant was told that he/she would be playing with a few toys then was asked what they thought another child would like to play with and what the participant would like. Nine age-appropriate toys were in the box, consisting of three masculine (e.g., truck, car, action figure), three gender-neutral (blocks, tinker-toys, ball), and three feminine (e.g., baby doll, barbie, pony) toys. After the children removed the toys from the box, the Mini Perspective-taking Task began. The experimenter loaded a photograph of the same-sex child confederate on a laptop computer screen and introduced the participant to him/her by stating the confederate's name (either "Chevy" or "Jerzy"). The experimenter then placed three toys (one from each category, feminine, masculine, and gender-neutral) in front of the participant and the experimenter stated, "Hand me the toy that Chevy/Jerzy would like to play with." Once the participant selected a toy, it was removed and the experimenter repeated the question with the two remaining toys. At the end of this assessment for the 3 toys, the experimenter directed the child to video footage of the child confederate going through the same preference assessment with the same toys by stating, "Let's see what toys Chevy/Jerzy plays with." The experimenter asked the participant, "What does Chevy/Jerzy like to play with?" three times during the observation phase beginning with the first question 20 seconds into the video. If the participant answered correctly by accurately reporting what the confederate was playing with after the first time the question was asked, the experimenter then delivered social praise ("great job" or "you're right") and if the participant did not answer or answered

incorrectly, the experimenter allowed for self-correction and if necessary provided feedback by saying "Actually Chevy/Jerzy likes to play with (toy). What toy does Chevy/Jerzy like to play with?" Once the participant answered correctly (correct was the participant reporting a gender opposite preference for the confederate), social praise was delivered. After the verbal section was over, the participant then was allowed to continue viewing the video. Participants went through this assessment once per day for up to 14 days. After the mini perspective-taking task, the experimenter loaded a photograph of the gender-opposite child confederate and introduced the participant to him/her by stating the confederate's name (either "Chevy" or "Jerzy"). Then, a paired-stimulus preference assessment was conducted. During the paired-stimulus preference assessment, the experimenter presented two toys from different categories (i.e., masculine, gender-neutral, feminine) to the participant. Each time the toys were presented, the experimenter displayed the photograph of the participant on the screen, then the experimenter stated, "Hand me the toy that you would like to play with." After each pairing of toys was presented, the same pairing was presented again. This time, the participant was shown a photograph of the confederate on the screen, and asked to "hand me the toy that Chevy/Jerzy would like to play with." The experimenter continued presenting pairs of toys in this manner until a total of twelve trials had been conducted (six trials assessing the participant's preference, six trials assessing the participant's knowledge of the confederate's preference).

### **Sessions 2 - 15**

The second phase of the experiment was the Multiple Stimulus Without Replacement Preference Assessment & Observation Sessions. The experimenter

presented three toys to the participant and stated, "Take the toy that you would like to play with." Once the participant selected a toy, the experimenter instructed the participant to "Play with the toy and tell me when you are done." The participant had up to one minute to play with the toy. Once the participant told the experimenter that he/she was done playing with the toy, or the timer reached one minute, the trial ended and the toy was removed. Then, the remaining two toys (with the toy the participant first selected omitted) were presented to the participant, with the experimenter stating, "Take the toy that you would like to play with." Again, the participant was given up to a minute to play with the toy he/she selected. Then, the remaining toy (with the two toys the participant previously selected omitted) was given to the participant. The experimenter instructed the participant to "Play with the toy and tell me when you are done." At the end of the assessment for the three toys, the experimenter then directed the child to view video footage of the child confederate going through the same preference assessment with the same toys by stating, "Let's see what toys Chevy/Jerzy plays with". Participants went through this phase until the criterion for mastery had been met during the mastery probe.

### **Sessions 11-13**

If, by session 10, the participant was not able to pass the mastery probes, an additional verbal prompt, similar to that in the Mini Perspective-taking Task, was added. After the child interacted with the three toys, the experimenter then directed the child to view video footage of the child confederate going through the same preference assessment with the same toys by stating, "Let's see what toys Chevy/Jerzy plays with." Participants were asked to report which toy the child confederate prefers and was praised

for a correct answer and was given feedback for incorrect answers. After the prompt, the child watched the rest of the video.

### **Sessions 14-15**

If, by session 13, the participant had not been able to pass the mastery probes with the additional verbal prompt, a test and representation of the video was added. After the child interacted with the three toys, the experimenter then directed the child to view video footage of the child confederate going through the same preference assessment with the same toys by stating, "Let's see what toys Chevy/Jerzy plays with." Participants were asked to report which toy the child confederate prefers and was praised for a correct answer and was given feedback for incorrect answers. After the video had ended, the three toys were represented and the experimenter asked the child to "Hand me the toy that Chevy/Jerzy would like to play with." If the child answered correctly, he/she received social praise and the toy was removed. If the child was incorrect, the experimenter provided feedback by saying, "Actually Chevy/Jerzy likes to play with this toy. Which toy does Chevy/Jerzy like to play with?" and the toy was removed. The same process was done with the two remaining toys.

### **Mastery Probe (Sessions 4-15)**

This mastery probe was conducted in the beginning of session following a minimum of two observation days without mastery probes to ensure that participants had at least two days of exposure to the video observation sessions. Similar to the pre-test, a paired-stimulus preference assessment was conducted that consisted of only three trials instead of twelve. During the paired-stimulus preference assessment, the experimenter presented two toys from different categories (i.e., masculine, gender-neutral, feminine) to

the participant. Each time the toys were presented, the experimenter displayed the photograph of the gender-matched confederate on the screen, then the experimenter stated "hand me the toy that you think Chevy/Jerzy would like to play with." A correct answer during this mastery probe was the participant selecting toys that were meant for a gender-opposite child (i.e. if it was the female confederate, they would be accurate if they selected masculine or gender-neutral toys). There was no prompting or feedback given by the experimenter during this mastery probe. In order for the participant to pass the mastery probe, he/she had to score 3/3 correct to move on to the post-test sessions. If the participant passed with 3/3, he/she were immediately moved on to post-test for the session. If the participant did not pass, he/she continued with the multiple stimulus without replacement preference assessment and observation phase until he/she reached a maximum of 16 sessions or reached criterion on the mastery probe.

### **Post-Test**

The post test was conducted in the same manner as the pre-test: Once with all of the toys the child was exposed to in the previous sessions, and one more time with three novel toys, for a total of twenty-four trials. At the end of the post-test, the participant was presented with the three familiar toys and instructed to "Hand me the toy that both you and Chevy/Jerzy like to play with". Then the three novel toys were presented with the same instructions given. After these final questions, the participant was thanked for participating, asked if he/she had any questions, and told that he/she may select one toy from a toy chest for his/her participation.

### **Data Collection and Interobserver Agreement**

The participants' performance was recorded as inaccurate or accurate. For the

participants' performance to be determined to be accurate, data must have shown an the participant provided an accurate report of confederate preference in both observed and novel circumstances. Interobserver agreement was conducted via coding of video of each experimental session. Observers were given instructions and training on how to code data from the videos of the experimental session. Interobserver agreement data was taken on 83% of trials with 96% accuracy.

### **Results**

In the case of the participant's preference, if Table 1 describes a participant's performance as 'same', that means the participant kept the same preference across the pre-test, post-test, and novel test preference assessments. 'Same' also implies that the participant's preference was not influenced by the preference of the confederate, and that he/she was able to keep the same report of their own preference throughout the post-tests. Further, if the participant's preference is described as 'different' across tests, this label indicates that the participant's preference did not remain the same from pre-test to post-test or novel test.

Table 1

*Participant Performance on Self and Confederate Post-tests*

Name	Self (Pre-Post)	Self (Post-Novel)	Confederate (Post-test)	Confederate (Novel test)
Todd	Same	Same	Inaccurate	Inaccurate
Ella	Different	Same	Inaccurate	Inaccurate
Jacob	Same	Same	Inaccurate	Accurate
Max	Same	Same	Accurate	Inaccurate
Lily	Same	Different	Accurate	Accurate

*Note.* If the Self (Pre-Post or Post-Novel) is ‘Same,’ the participant kept their preference across tests. If the Self (Pre-Post or Post-Novel) is ‘Different,’ the participant did not keep their preference across tests. If the Confederate (Post-test or Novel test) is ‘Inaccurate,’ the participant did not report the gender opposite preference shift of the confederate. If the Confederate (Post-test or Novel-test) is ‘Accurate,’ the participant reported the gender opposite preference shift of the confederate.

If the participant is said to be ‘accurate’ within the post-test or novel test, this label indicates that they reported the confederate’s preference to be strongly in favor of gender-opposite toys. For example, for a male participant, ‘accurate’ would be if they reported that the confederate, Chevy, had a strong preference for feminine toys. ‘Inaccurate’ in either the post-test or the novel test means that they did not show the confederate’s preference for gender-opposite toys, and instead indicated they still preferred gender-same or gender neutral toys.

The results of this study are depicted in Table 1. Two participants were inaccurate when reporting the preference of the confederate in both the post-test and the novel test

(Todd and Ella). One participant reported accurately only in the post-test (Max), and one accurately reported only on the novel test (Jacob). One participant was accurate across both the post-test and novel test (Lily). Three participants kept their preferences from the first session to the last (Todd, Jacob, and Max) and the other two differed in either the post-test or the novel test. Three participants ranged from 3 to 4 total sessions (Todd, Ella, and Jacob) while the other two took the full 16 sessions to complete the study (Max and Lily). Four of the five participants were accurate 100% of the time on the verbal prompts, while one participant (Lily), was accurate 81% of the time. One participant was accurate on the Mini Perspective-taking Tasks 100% of the time (Ella), while the remaining four participants ranged in accuracy rates ranging from 50% to 75% (Table 2).

Table 2

*Participant Demographic and Session Data*

Name	Age	Sibling Age Difference	Gender	Sibling Gender Comparison	Sessions	Percentage of MPT Passed	Percentage of Verbal Test Passed
Todd	3	12 yrs. Older	M	Different	4	50%	100%
Ella	3	4 yrs. Older	F	Different	3	100%	100%
Jacob	5	4 yrs. Younger	M	Different	4	75%	100%
Max	4	2 yrs. Younger	M	Same	16	75%	100%
Lily	3	1 yrs. Younger	F	Same	16	62.50%	81.25%

*Note.* For Sibling Age Different, ‘Older’ means the participant’s sibling was some number of years older than the participant. For Sibling Age Difference, ‘Younger’ means the participant’s sibling was some number of years younger than the participant. For Sibling Gender Comparison, ‘Different’ means the participant’s sibling was the opposite gender of the participant. For Sibling Gender Comparison, ‘Same’ means the participant’s sibling was the same gender as the participant. ‘MPT’ in Percentage of MPT



Passed means Mini Perspective-taking Task.

Demographic information is illustrated in Table 2. The age range of the participants was 3 to 5 years old. Participants had siblings who ranged in age from 1 to 15 years old. Two of the participants were younger than their siblings with a 4 to 12 year difference in age (Todd and Ella). The other three were older than their siblings with age difference ranging from 1 to 4 years. Two participants' siblings were gender same (Max and Lily) and the other three had gender opposite siblings.

### **Discussion**

The results from this study point out various aspects for further analysis. To summarize, only one child, Lily, was accurate in both post-test conditions and demonstrated the perspective-taking skill. The other four participants either did not pass both of the post-tests (Ella and Todd), or passed one of the two conditions (Max and Jacob). Of all of variables analyzed in this study, birth order, age difference between participant and sibling, and gender difference between participant and sibling seemed to have a stronger relationship with the participant's ability to perspective-take. Therefore further analysis of these variables was preformed to help uncover other factors that seemed to contribute largely to the acquisition of this skill.

Although participant preference remained the same across several participants and sessions, it is important to note why consistency in this regard is necessary. If a participant does not maintain their own preference from pre-test to post-test or post-test to novel test, this change would indicate that the participant's own preference is not consistent. If the participant and confederate had the same preference at the beginning of

the study, then the participant would not be reporting the perspective of another. Rather, the participant would simply be reporting his/her own preference instead. Two participants, Ella and Lily, reported a small variation in his/her own preference during one of the two final preference assessments. However, because the participant's report of his/her own preference was for the most part quite consistent, this was not as much of a factor that would cause them to be removed from the study.

Within this study it was shown that duration of relationship did not directly affect a child's ability to perspective-take. The results showed that the two participants who were among the most accurate on the post or novel tests of the confederate (Max and Lily) never passed the mastery probe that was designed to indicate that they had acquired accurate perspective-taking of the confederate. One of the proposed reasons the number of sessions were so high for those two participants was not because it just took those participants longer to acquire the skill perspective-taking. Rather the lack of acquisition may have been an issue of noncompliance within the session time may have affected their ability to perform accurately during mastery probes. Due to this issue of noncompliance, the variable of duration was not explored in the way intended. Noncompliance took the form of not attending to the video, not paying attention to prompts from the experimenter, manipulating the toys at inappropriate times, and joking during preference assessments. Seeing that the difficulty of the task may not have been what caused the number of sessions to be much higher than the other three participants, future studies may want to explore more difficult or varied tasks. Differing the complexity or substance of the task would prolong the duration of the study because the participants would not be able to acquire the skill, or respond accurately, in only 3 or 4 sessions.

Verbal behavior, another factor, was analyzed in this study. Data presented in Table 2 show that there were no relationships between accuracy on verbal prompting task and accuracy on the confederate centered post-test or novel test. The added verbal prompts in sessions 11 through 15, and test with feedback in sessions 14 and 15, also did not show any relationship with more accurate responding in the post-tests.

Anecdotal data on spontaneous speech regarding the confederate's preference or the preference of the participant in and out of the experimental sessions also did not have a relationship with the accuracy on the post-test or novel test regarding the confederate. Further, spontaneous statements regarding preference did not seem to be related to the participant's ability to maintain his or her own preference throughout the study.

Demographic data was instrumental in determining other variables that may contribute to a child's ability to perspective-take. Birth order, proximity to age of sibling, and gender of sibling were found to have been potential factors in the accuracy of perspective-taking of another.

Strong relationships between birth order and accuracy were seen with participants Lily, Jacob, and Max. In these families, these three participants were older than their siblings. Birth order may be a factor in the ability of another to perspective-take, as the oldest sibling has the opportunity to observe a younger sibling engage in activities or behaviors in which the sibling has already mastered. Even though their younger siblings most likely did not have gender opposite preferences, like the confederates shown in the study, the participants were able to take what they learned from multiple observations of a child interacting with a set of toys (much like they would see with their younger sibling), and accurately report those preferences.

Further, the participants who had siblings who were older than they at the time of the study were not accurate in either portions of the confederate post-test. The participants that fit this description were Todd and Ella. The accuracy with participants who were older than their siblings may be explained by the participants who were younger than their siblings not being able to observe the older sibling playing as much, or not having an interest in the toys that the sibling interacts with, therefore, the younger participant never contacted those observational or interactive opportunities.

Another factor that is related to the accuracy of a child's ability to perspective-take is the age difference between the participant and the sibling. The two participants (Todd and Ella) who were across the board inaccurate during the post-tests both had age differences between four and twelve years. Furthermore, the three participants who had an age difference of one to four years from their sibling (Max, Jacob, and Lily) were all accurate in some portion in the post-test. The reason for accuracy among participants who have a small age difference between participant and sibling can best be explained in a similar fashion to the birth order relationship. Perhaps because the participants and their siblings had a smaller age range between them, the participants were interested and would play with the toys from the same age range and therefore had more exposure and experience with their preferences and the preferences of their siblings.

Finally, the gender of the participant's sibling may have been a factor in accurately reporting the perspective of another. Two participants (Max and Lily) have gender same siblings and were accurate throughout the post-test, while the three participants (Todd, Ella, and Jacob) who have gender opposite siblings preformed inaccurately on the confederate post-test. One reason gender may affect a child's

accuracy on a perspective-taking task based on preference is that a participant with a gender same sibling may have more experiences wherein they observed a gender same child preferring different toys than he/she preferred. Therefore, when a participant observes these preference differences with their siblings, he/she may be more open to the confederate in the study having different preferences and be more accurate when reporting that. Further, these two participants were also exposed to more sessions (perhaps due to noncompliance) and therefore it is unclear if the gender of the participant's sibling is a significant factor in terms of confederate post-test performance.

## **Conclusion**

### *Limitations*

The potential limitation in this study would be the noncompliance seen throughout sessions with the participants. For the purposes of this study, noncompliance is defined as any time a participant was not complying with the instructions of the experimenter. An example of noncompliance would be if a participant did not watch the video after being reminded to do so. Many aspects of the experimental setting attempted to avoid issues with noncompliance such as rooms with little to no distraction, and beneficial consequences that were provided (like stickers) contingent upon compliant behavior. Specifically, most noncompliant behaviors were seen with participants Max and Lily through the entirety of each session. On a lesser scale, the remaining three participants were noncompliant in the video observation stage because they needed to be prompted various times to attend to the video. Noncompliance was seen during all phases of data collection, and although noncompliance was ignored in all instances that it could be, noncompliance still interfered with video observation sessions and preference

assessments for both the participant and the confederates. To avoid this issue in future studies, perhaps the use of a token economy through the duration of the experimental sessions may help to keep participants more focused and on task.

Another limitation with this study was the low number of participants that were run through experimental sessions. Due to the timeline for thesis completion and the nature of the study, the number of participants that could be run was not as high as it would ideally be. In the future, this study could be replicated to be able to make more observations of the relationships between demographic variables and duration of relationship. Further, more participants would help to make any found relationships between these variables, or variations among variables, more generalizable to other children.

### *Implications*

The findings of this study may contribute to aiding those who have trouble acquiring and/or maintaining the skill of perspective-taking. First, this study may contribute to autism research and aid in development of a curriculum to help teachers work on this skill in classrooms of typically developed, and special education students. One of the hallmark deficits in children diagnosed with autism is that they do not develop the skill of perspective-taking like typically developed children do (Gould, Tarbox, O'Hora, Noone, & Bergstrom, 2011). Results from this study and future studies of this nature may support the importance of peer interactions for kids with autism. This study showed that siblings may influence a child's ability to acquire this skill, and if a child with autism has access to interactions with siblings or peers, it may assist them in acquiring or maintaining the skill of perspective-taking. In the same vein, facilitating peer

to peer interactions with typically developed children may help those children develop the perspective-taking skill as it is not commonly directly taught within lower level curricula (Suway, Degnan, Sussman & Fox, 2012).

Work in perspective-taking is also important to help adults who may have issues with maintaining this skill. Adults who lack the skill of perspective-taking, or have a poor grasp of the skill, may benefit from studies on perspective-taking because the skill has been linked with having strong social and communication skills. With further research into the variables necessary to acquire the skill, results from further research may help to determine what factors need to be present within a person's environment to maintain the skill through life.

This study is important to Behavior Analysis and the larger field of psychology because this methodology is unique. Future studies can explore this same method, or apply it to investigations of other types of complex human behavior. Further, this study also isolated key factors that may help aid in studies with children in the future. Variables such as building rapport and a type of token economy to help avoid noncompliance during experimental sessions may help to ensure more accurate responding from participants.

#### *Future Directions*

Results of this study lend to many future directions for studies to follow. The first future direction is in the area of verbal behavior that did not turn out to be a large contributing factor in this study. Although anecdotal data in this study did not show that spontaneous speech in and outside of the experimental session had any relationship to a child's ability to accurately report another's preference, there may be different ways to

explore these variables further. Studies that may focus more on prompting of accurate verbal accounts of preference or tracking spontaneous speech may highlight how verbalizations affect the skill of perspective-taking. Further, after transcribing sessions, a categorization process could be used that may more specifically point to the types of speech participants who are more accurate tend to engage in during sessions.

Second, addressing the duration component of the study, further studies might explore the effect of a more complex task on the performance of the participants. For example, it might be interesting to do a test with a larger number of toys or a different type of gender categorized item (such as stickers or television shows). A more complex study may provide information regarding the types of tasks that may facilitate learning the perspective-taking skill and may also help in the development of curricula on perspective-taking by indicating what level of tasks should be taught prior to a child acquiring the skill. Further, as mentioned previously, more difficult tasks may also help to extend the duration of relationship necessary to be accurate when reporting confederate preference, which would help to avoid noncompliance.

Finally, in regards to some of the variables found in this study, future studies can help to better isolate these factors to determine their correlations with perspective-taking. Future studies may run participants who vary in birth order. The majority of the participants in this study did not have more than one sibling at the time of the study and therefore, only suggestions could be made regarding those data. However, in the future it would be helpful to work with participants ranging in birth order from first born, to even fifth or sixth born to determine if being born at different times may affect the child's ability to perspective-take.



Another issue that would have been important to explore is the performance of a child who did not have any siblings. Running experimental sessions with children of different ages who have no siblings may shed light on how much age, peer interaction, or parenting style may contribute to a child's ability to perspective-take.

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*Appendix:*

Example of demographic survey completed for each participant prior to beginning sessions.

**Parental Survey**

1. What is your child's gender?  
☐ Female      ☐ Male
2. What is your child's date of birth?  
 \_\_\_\_/\_\_\_\_/\_\_\_\_  
 Month      Day      Year
3. On average, how often does your child miss school (i.e. leaving early, arriving late, not attending) per academic year?  
☐ 0-3      ☐ 4-7      ☐ 8-11      ☐ 11+
4. How many parents/guardians are living in the house (including yourself)?  
☐ 1      ☐ 2      ☐ 3      ☐ 4+
5. What is your marital status?  
☐ Single      ☐ Divorced      ☐ Married
6. What is your level of education and the level of education of your spouse/partner?  
 You: ☐ High School Diploma or equivalent   ☐ Associates   ☐ Bachelors   ☐ M.A.   ☐ Ph.D.  
☐ N/A  
 Spouse/Partner: ☐ High School Diploma or equivalent   ☐ Associates   ☐ Bachelors   ☐ M.A.   ☐ Ph.D.   ☐ N/A
7. List all siblings' ages and genders in birth order
8. Parental Contact Information